

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
9 June 2005 (09.06.2005)

PCT

(10) International Publication Number
WO 2005/053060 A2

(51) International Patent Classification⁷: **H01M**
(21) International Application Number:
PCT/US2004/038691

(22) International Filing Date:
19 November 2004 (19.11.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/523,332 20 November 2003 (20.11.2003) US

(71) Applicant (for all designated States except US): **VIRGINIA TECH INTELLECTUAL PROPERTIES, INC.**
[US/US]: 1872 Pratt Drive, Suite 1625, Blacksburg, VA 24060 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **HARRISON, William** [-/US]. **GHASSEMI, Hossein** [-/US]. **ZAWODZINSKI, Tom, A., Jr.** [-/US]. **MCGRATH, James, E.** [-/US].

(74) Agents: **WHITHAM, Michael, E.** et al.; Whitham, Curtis & Christofferson, P.C., 11491 Sunset Hills Road, Suite 340, Reston, VA 20190 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

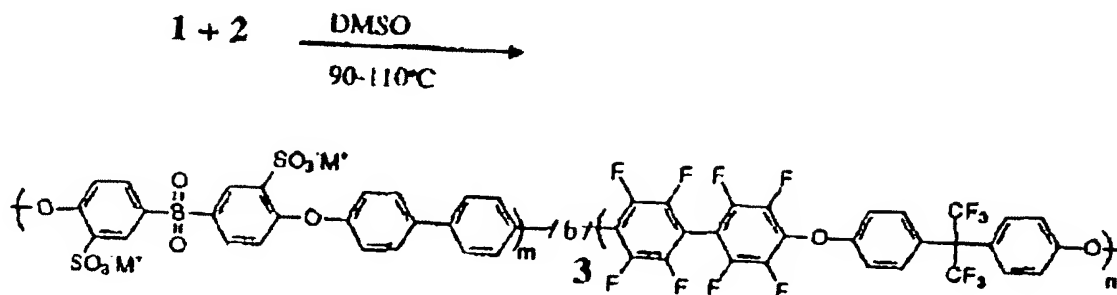
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: MULTIBLOCK COPOLYMERS CONTAINING HYDROPHILIC-HYDROPHOBIC SEGMENTS FOR PROTON EXCHANGE MEMBRANE



(57) Abstract: Novel multiblock copolymers containing perfluorinated poly(arylene ether) as a hydrophobic segment and disulfonated poly(arylene ether sulfone) as a hydrophilic segment are provided. The multiblock copolymers are used to form proton exchange membranes that are thermally and hydrolytically stable, flexible, and that exhibit low methanol permeability and high proton conductivity. The proton exchange membranes are thus well-suited for use as polymer electrolytes in fuel cells.